Agilent 1260 Infinity Multi-Detector GPC/SEC System

Accurate, information-rich polymer characterization

Data Sheet

Introduction

Gel permeation chromatography (GPC), also referred to as size exclusion chromatography (SEC), is the technique of choice to characterize polymers. In conventional GPC/SEC, average molecular weights are calculated relative to the standards used to calibrate the column set. The Agilent 1260 Infinity Multi-Detector GPC/SEC System is a high-end multiple detector platform, which provides not only accurate molecular weight data independent of the chemistry of the standards, but also gives insight into the behavior of the polymer in solution.

High performance GPC/SEC as standard

The system is based on the reliable Agilent 1260 Infinity LC modules, enhanced with the 1260 Infinity GPC/SEC Multi-Detector Suite. This addition allows any combination of up to three detector modules, in series, making this the premium solution for GPC.

Agilent Technologies

1260 Infinity MDS Refractive Index Detector

A highly stable differential refracive index detector measures the concentration of polymer molecules as they elute from the column. The RID is employed in series and provides:

- Distribution of polymer chain lengths
- Molecular weights relative to the standards used to calibrate the columns set

1260 Infinity MDS Light Scattering Detector

A powerful dual-angle light scattering detector measures the scattering of light by polymer molecules at a high and a low angle. In combination with a concentration detector, light scattering provides:

- Absolute molecular weights without the need for a column calibration
- Accurate assesment of molecular size, radius of hydration (Rg) and hydrodynamic radius (Rh)
- Direct determination of long chain branching

1260 Infinity MDS Viscometer

A robust and sensitive viscometer measures the viscosity of the polymer molecules in solution. In combination with a concentration detector, the viscometer provides:

- Accurate molecular weights regardless of the standards used to generate the column calibration
- Accurate assessment of intrinsic viscosity
- Conformation
  - Mark-Houwink paramters
  - Accurate branching measurements across a broad range of molecular weights

The complete system – triple detection

By combining the viscometer, refractive index and light scattering detector, the most advanced form of GPC is attained. Triple detection provides:

- Absolute molecular weights without the need for a column calibration
- Accurate assesment of molecular size and dimensions
- Accurate measurement of intrinsic viscosity
- Complete information regarding polymer conformation and branching

Ultra low dispersion

Building on the UHPLC capabilities of the Agilent 1260 Infinity Series, the 1260 Infinity GPC/SEC MDS is minimizing dispersion in GPC. The dual angle light scattering flow cell has a market-leading cell volume of just 10 µL. The high back-pressure RI cell is just 6 µL. The viscometer is based on the latest advances in silica technology to create the ultimate balanced bridge.

Excellent baseline stability

Each detector can be individually heated to 60 °C to ensure stable baselines and excellent signal-to noise performance. Advanced optical design drastically reduces baseline spiking in LS traces commonly seen at low angles.

Agilent GPC/SEC software

The 1260 Infinity Multi-Detector GPC/SEC System is fully controlled with the new Agilent GPC/SEC software – a standalone dedicated software package, capable of controlling all of the 1200 Infinity Series LC modules – with a simple and customizable interface. The comprehensive range of calculations provide a wide range of molecular weight parameters defining size and shape. All the data can be overlaid, giving an at-a-glance view of a library of results.

Modular cabinet design

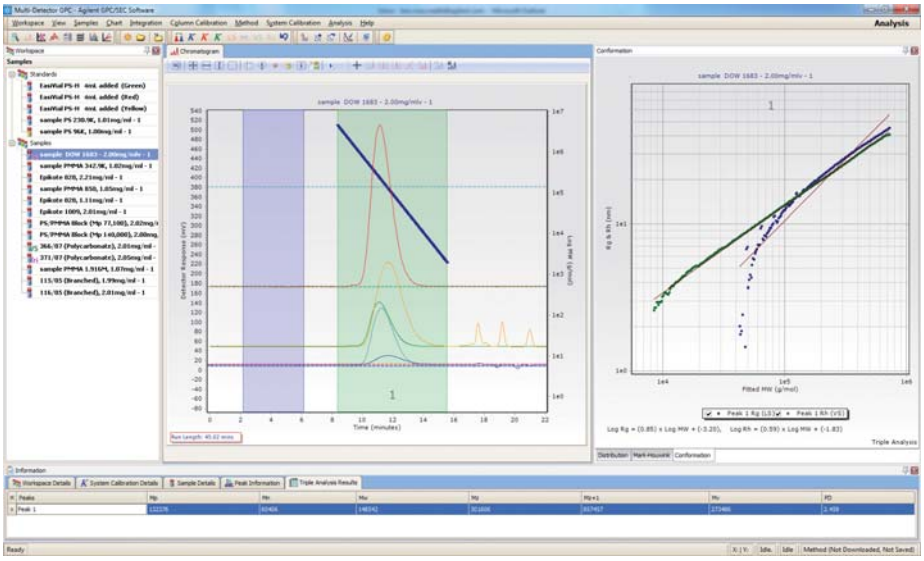
The 1260 Infinity GPC/SEC MDS is configured with dual or quad detector cabinets depending on choice of detectors. Storage areas in the cabinet doors hold documentation, essential instrument accessories, and tools. If a detector cabinet has an empty detector bay, a tidy drawer system is supplied, providing a convenient location for storing columns and larger accessories.

Upgradability

The system is fully upgradable at any time, allowing your system capabilities to expand as budget allows.

Control unit

The control unit with touch sensitive keypad is mounted on top of the cabinets for quick operation or visual inspection of status summary. The keypad allows full control of all aspects of the detectors.



Collection of multi-detector chromatogram and advanced calculations from analysis of a polystyrene sample.

Minimal downtime

The menu system service options are password protected to safeguard the system from accidental changes. Each detector can be independently removed and replaced so that the instrument remains in operation maximising sample throughput and productivity.

Safety first

The 1260 Infinity Multi-Detector GPC/SEC System contains multiple sensors to detect solvent leaks. On sensing a leak, heating of the detector cells is immediately stopped and the pump flow is halted. The control unit ensures the continual performance of the instrument safety features by internally checking the heating elements and leak sensors at regular intervals.

System details

A complete Agilent 1260 Infinity Multi-Detector GPC/SEC System includes:

- Agilent 1260 Infinity LC System to provide precise and reproducible solvent delivery
- Agilent 1260 Infinity MDS Refractive Index Detector, installed in series to provide accurate concentration information for all of the analyte
- Agilent 1260 Infinity MDS Viscometer with the widest dynamic range to suit any chemistry or molecular weight
- Agilent 1260 Infinity MDS Light Scattering Detector, simultaneously using a high, 90° angle for precision, and a low 15° angle for accuracy

Specifications - 1260 Infinity GPC/SEC Multi-Detector Suite

Agilent 1260 Infinity MDS Refractive Index Detector	
Cell volume	6 µL
Pressure rating	350 kPa (50 psi)
Wavelength	660 nm
Temperature range	30 - 60 °C
Temperature stability	± 0.2 °C
Agilent 1260 Infinity MDS Viscometer	
Shear rate (typical)	3000 s^{-1}
Sensitivity ηsp	1 x 10^{-5} Pa. s
Temperature range	30 - 60 °C
Temperature stability	± 0.2 °C
Agilent 1260 Infinity MDS Light Scattering Detector	
Sample cell volume	10 µL
Light scattering volume	0.01 µL
Laser wavelength/power	660 nm/50 mW
Rayleigh scattering angles	15 ° and 90 °
Temperature range	30 - 60 °C
Temperature stability	± 0.2 °C

For specifications on the front-end Agilent 1260 Infinity GPC/SEC System, refer to the Agilent Data Sheet 5990-9920EN.

Ordering Information

Part Number	Description
G7800A	1260 Infinity Multi-Detector GPC/SEC
G7801A	1260 Infinity MDS RID
G7802A	1260 Infinity MDS Viscometer
G7803A	1260 Infinity MDS Light Scattering
G1310B	1260 Infinity Isocratic Pump
G1322A	1260 Infinity Standard Degasser
G1314F	1260 Infinity Variable Wavelength Detector
G1316A	1260 Infinity Thermostatted Column Compartment
G1328C	1260 Infinity Manual Injector
G1329B	1260 Infinity Standard Autosampler
G7850AA	Agilent GPC/SEC Software
G7854AA	Agilent GPC/SEC Instrument Control
G7852AA	Agilent GPC/SEC Multi-Detector Upgrade

www.agilent.com/chem/gpc

This information is subject to change without notice.

© Agilent Technologies, Inc. 2012
Published in the USA, March 15, 2012
5990-9921EN

Agilent Technologies